

WHAT IS CLAIMED IS:

1. A reactor vessel comprising:

a catalyst nozzle for delivering catalyst to said reactor vessel;

a feed nozzle for delivering feed to said reactor vessel, said feed nozzle

5 joining said catalyst nozzle at a joint proximate to a work point at which  
said catalyst contacts said feed to convert said feed to yield product  
vapor;

a transport conduit having an inlet for receiving said product vapor and

entrained catalyst and an outlet, said inlet being disposed vertically higher  
10 than said joint between said feed nozzle and said catalyst nozzle; and

a cyclone having an inlet directly communicating with said outlet of said

transport conduit, said cyclone communicating with a vapor outlet

extending from said vessel and a dipleg extending downwardly from said

cyclone for transporting catalyst toward a base of said reactor vessel.

15 2. The reactor vessel of claim 1 further comprising a stripping section at the  
base of reactor vessel for stripping product vapors from said catalyst.

3. The reactor vessel of claim 2 wherein said stripping section includes a  
series of trays and stripping medium is injected into said stripping section.

4. The reactor vessel of claim 1 wherein said catalyst nozzle includes a slot  
20 for generating a curtain of catalyst.

5. The reactor vessel of claim 4 wherein said feed nozzle includes a feed contactor for injecting feed into said curtain of catalyst.

6. The reactor vessel of claim 4 wherein said catalyst nozzle includes a funnel section that dispenses through said slot.

5 7. The reactor vessel of claim 1 wherein said inlet faces away from said work point.

8. A catalytic cracking reactor vessel comprising:

a catalyst nozzle for delivering catalyst to said reactor vessel;

a feed nozzle for delivering feed to said reactor vessel, said feed nozzle

10 joining said catalyst nozzle at a joint proximate to a work point at which

said catalyst contacts said feed to crack said feed to yield product vapor;

a transport conduit having an inlet facing away from the work point, said

inlet for receiving said product vapor and entrained catalyst and an outlet,

said inlet being disposed vertically higher than said joint between said

15 feed nozzle and said catalyst nozzle; and

a separator having an inlet directly communicating with said outlet of said

transport conduit, said separator communicating with a vapor outlet

extending from said vessel and a conduit extending downwardly from

said separator for transporting catalyst toward a base of said reactor

20 vessel.

9. The reactor vessel of claim 8 further comprising a stripping section at the base of reactor vessel for stripping product vapors from said catalyst.

10. The reactor vessel of claim 9 wherein said stripping section includes a series of trays and stripping medium is injected into said stripping section.

11. The reactor vessel of claim 8 wherein said catalyst nozzle includes a slot for generating a curtain of catalyst.

5 12. The reactor vessel of claim 11 wherein said feed nozzle includes a feed contactor for injecting feed into said curtain of catalyst.

13. The reactor vessel of claim 11 wherein said catalyst nozzle further includes a funnel section that dispenses through said slot.

10 14. The reactor vessel of claim 8 including a heat nozzle for delivering catalyst to said stripping section.

15 15. A process for cracking a heavy hydrocarbon feed to a light hydrocarbon product comprising:

delivering catalyst to a reactor vessel through a catalyst nozzle;

delivering heavy hydrocarbon feed to said reactor vessel through a feed

15 nozzle, said feed nozzle joining said catalyst nozzle at a joint;

contacting said catalyst and said heavy hydrocarbon feed at a work point

proximate to said joint to convert said heavy hydrocarbon feed to light hydrocarbon product vapor;

20 withdrawing said product vapor and entrained catalyst through an inlet in a transport conduit, said inlet being disposed vertically higher than said joint between said feed nozzle and said catalyst nozzle;

transporting said light hydrocarbon product vapor from said inlet through an  
outlet in said transport conduit directly to a cyclone; and  
separating said entrained catalyst from said light hydrocarbon product vapor  
in said cyclone.

5        16. The process of claim 15 further comprising expelling said catalyst from a  
dipleg of said cyclone.

17. The process of claim 16 further comprising stripping said catalyst  
expelled from said dipleg of entrained hydrocarbons.

10       18. The process of claim 15 further comprising expelling said lighter  
hydrocarbon product vapor from an outlet of said cyclone.

19. The process of claim 15 further comprising generating a curtain of  
catalyst before said catalyst is contacted with said heavy hydrocarbon feed.